

Notes on the biology of *Polyommatus (Agrodiaetus) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993 (Lepidoptera, Lycaenidae)

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Abstract: *Polyommatus (Agrodiaetus) damocles damocles* (HERRICH-SCHÄFFER, 1844), *P. (A.) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993, *P. (A.) poseidon poseidon* (HERRICH-SCHÄFFER, 1851) and *P. (A.) poseidon krymaeus* (SHELJUZHKO, 1928) are regarded as a complex of closely related species. The ecological features of *P. (A.) poseidon krymaeus* and *P. (A.) damocles rossicus* proved to be very similar. It is supposed that the evolution of the subgenus *Agrodiaetus* was parallel with the evolution of the fabaceous plant genera *Hedysarum* L. and *Onobrychis* GAERTN. as larval foodplants.

Anmerkungen zur Biologie von *Polyommatus (Agrodiaetus) damocles rossicus* DANTCHENKO & LUKHTANOV 1993 (Lepidoptera, Lycaenidae)

Zusammenfassung: *Polyommatus (Agrodiaetus) damocles damocles* (HERRICH-SCHÄFFER, 1844), *P. (A.) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993, *P. (A.) poseidon poseidon* (HERRICH-SCHÄFFER, 1851) und *P. (A.) poseidon krymaeus* (SHELJUZHKO, 1928) werden als ein nah verwandter Artenkomplex angesehen. Die ökologischen Bedürfnisse von *P. (A.) poseidon krymaeus* und *P. (A.) damocles rossicus* stellten sich als sehr ähnlich heraus. Es wird vermutet, daß die Evolution der Untergattung *Agrodiaetus* parallel mit den Schmetterlingsblütlergattungen *Hedysarum* L. und *Onobrychis* GAERTN. als larvale Futterpflanzen stattfand.

Up to now a lot of new taxa were described in the subgenus *Polyommatus (Agrodiaetus)* HÜBNER 1822). Each new *Agrodiaetus* publication generates a new version of the supposed relationships between the taxa according to new morphological criteria. Some of these criteria, indeed, seem to be very useful (CARBONELL 1993, DANTCHENKO 1994). However, the real number of species in the subgenus and the infrasubgeneric interrelationships are still puzzling. Examination of the type material in Muséum national d'Histoire naturelle (Paris) gave evidence that, for instance, *Agrodiaetus transcaspica avajica* (BLOOM, 1979) is not only a synonym of but also was described from the same type locality as *Agrodiaetus altivagans ectabaniensis* (DE LESSE, 1963) (DANTCHENKO & LUKHTANOV, in prep.). The biology of many *Agrodiaetus* species is still unknown. Meanwile I suppose that

morphological features of the taxa in complex groups of closely related species are not of superior importance in comparison with biological ones.

My preliminary study on the larval trophic relations of some *Agrodiaetus* species (*P. (A.) pseudactis* FORSTER, 1956, *P. (A.) phyllis* (CHRISTOPH, 1897), *P. (A.) ciscaucasica* FORSTER, 1956, *P. (A.) aserbeidschana* FORSTER, 1956) showed that they are monophagous on plants of the subtribe Hedysarinae of the family Fabaceae. In the Caucasus (DANTCHENKO, in prep.) the areas of closely related taxa of the *P. (A.) cyaneus* (STAUDINGER, 1899) complex are fitting well with the areas of closely related *Onobrychis* species of the subgenus *Sisyrosema* BGE.

DANTCHENKO & LUKHTANOV (1993) showed that *P. (A.) damone* (EVERSMANN, 1841) and *P. (A.) damocles* (HERRICH-SCHÄFFER, 1844) belong to different morphological complexes. I suppose that the following taxa belong to the “*damocles* complex”:

P. (A.) damocles damocles (HERRICH-SCHÄFFER, 1844)

P. (A.) damocles rossicus DANTCHENKO & LUKHTANOV, 1993 (see Figs.)

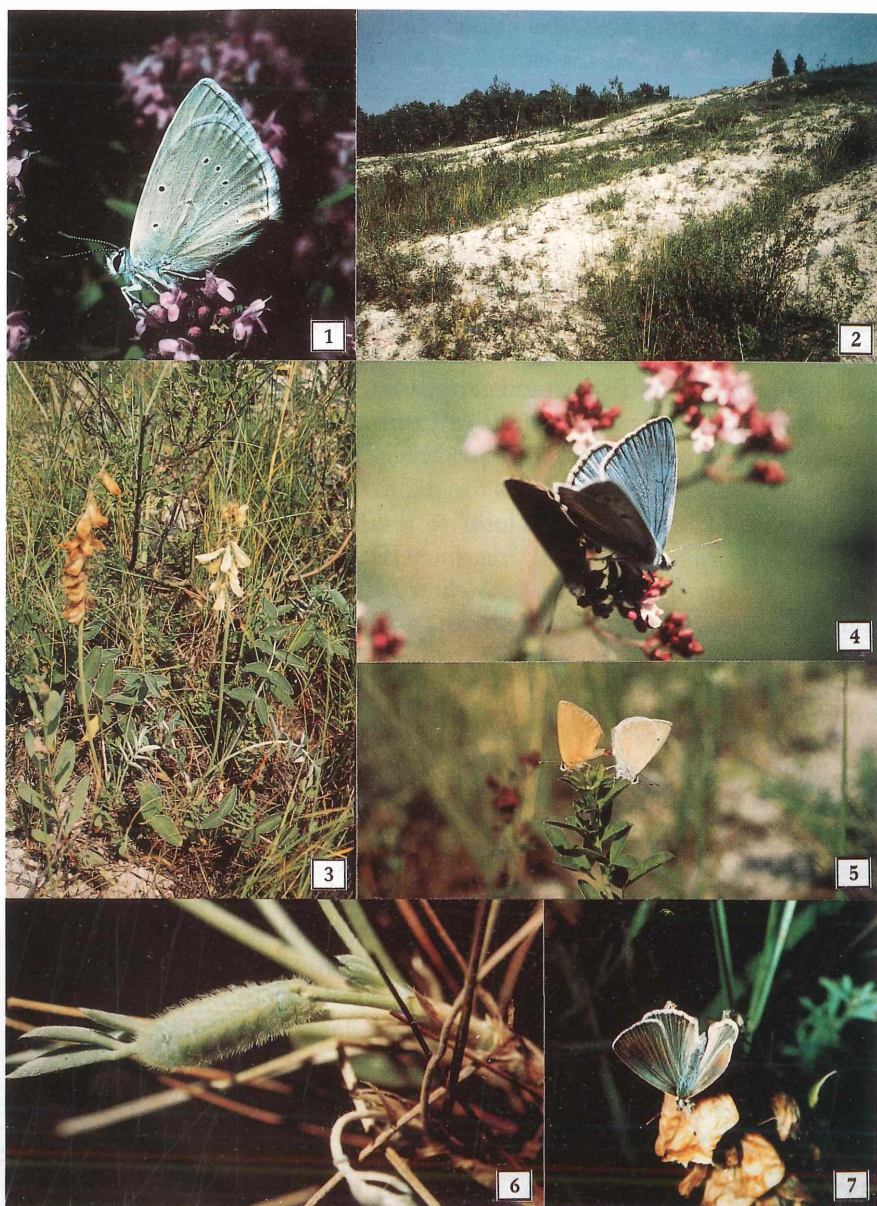
P. (A.) poseidon poseidon (HERRICH-SCHÄFFER, 1851)

P. (A.) poseidon krymaeus (SHELJUZHKO, 1928)

This complex appears to be a natural group.

Life history of *P. (A.) poseidon krymaeus* was described by BUDASHKIN (1990). My field investigations showed that the foodplant of *P. (A.) poseidon krymaeus* was *Hedysarum candidum* M. B. (Fabaceae). The biotope of *P. (A.) poseidon krymaeus* is the classic cretaceous outcrop. The flora of such localities was described in detail by TALIEV (1901, 1904). Being the specific plant cover of cretaceous outcrops for the area from Asia Minor up to Mongolia, the genus *Hedysarum* is represented by a number of closely related species, associated in Multicaulia and Subacaulia sections.

It seems logical to suppose that just like *P. (A.) poseidon krymaeus*, other taxa of this complex must be trophically connected with *Hedysarum*-species and inhabit the cretaceous outcrops. For this reason *P. (A.) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993 was studied in its type locality (Fig. 2) during July 9th–13th, 1993.



Figs. 1–7: Life history of *Polyommatus (Agrodiaetus) damocles rossicus* DANTCHENKO & LUKHTANOV, 1993. Fig. 1: ♂. Fig. 2: The type locality. Fig. 3: *Hedysarum grandiflorum* PALL. (Fabaceae), the larval foodplant. Figs. 4 & 5: Pairs of the species in copula. Fig. 6: Mature larva. Fig. 7: ♀.

The biotope is a cretaceous slope on the right bank of Volga river to the south of Volsk City. At the top, the slope is limited by sparse oak-forest, at the foot it is limited by bushes of *Rhamnus cathartica* and *Cytisus biflorus*. The south-front of the slope was practically deprived of soil. Here among several species of plants living on the cretaceous rocks *Hedysarum grandiflorum* PALL. (Fig. 3) was dominating. It could be also met in the adjacent parts of the forest.

We were very lucky to meet just the beginning of the imaginal flight activity of the species. The dynamics of its diurnal activity was typical for this group, the maximum was observed between 9 and 13 h. Near the afternoon more fresh specimens appeared. Freshly emerged males were feeding on the flowers of *Centaurea ruthenica* and *Thymus* cf. *serpyllum*, then patrolled in the biotope strictly near the stands of *Hedysarum grandiflorum*. At the open places the males of *P. rossicus* were actually the sole species of Rhopalocera. Closer to the forest border *Maculinea arion* L., *Polyommatus* (*Meleageria*) *daphnis* [DEN. & SCHIFF.], *Satyrrium spini* FABRICIUS, *Quercusia quercus* L., *Melitaea trivialis* [DEN. & SCHIFF.], *Melitaea didyma* ESPER, *Hipparchia fagi* SCOPOLI appeared.

On July 11th the first females were observed both copulating (Figs. 4, 5) and egg-laying (mainly on the stems of *Hedysarum grandiflorum*).

It is important to point out that I also observed here a female of *P. (A.) damone* which laid eggs on underside of the leaves of *Hedysarum grandiflorum*. I consider this species to be a member of another species-group.

In the laboratory, the *rossicus*-larvae emerged after six days of incubation. They were bred in glass test-tubes under the permanent illumination and at a temperature of 22 °C. The larval development was finished in 28 days. Mature caterpillars (Fig. 6) are very similar to those of *P. (A.) poseidon krymaeus*. The adults emerged after 27 days pupal phase and were in general smaller than specimens collected in the wild. I often observed that specimens of a second laboratory generation of monovoltine species are smaller than normal wild specimens.

As I supposed for *P. (A.) damocles rossicus* and *P. (A.) poseidon krymaeus* the ecological features including larval foodplants are very similar. I believe that the separation of natural groups on the basis of similarity of ecological parameters could be very useful for the whole subgenus, too.

In his recent work CARBONELL (1994) indicated that *Sophora alopecuroides* (Fabaceae) could be a possible foodplant for *P. (A.) poseidon poseidon*. However, this plant (= *Goebelia alopecuroides*, according to GROSSHEIM 1952) has no close relationship to *Hedysarum* species both taxonomically and ecologically. There is no congruence of the areas of *Goebelia alopecuroides* and of *P. (A.) poseidon poseidon*.

It seems more likely that *P. (A.) poseidon poseidon* is trophically bound to species closely related to *Hedysarum candidum*, for example *Hedysarum cappadocicum* BOISS. I would not be surprised if species like *P. (A.) damonides* (STAUDINGER, 1899), *P. (A.) elbursica* FORSTER, 1956, *P. (A.) transcaspica* (STAUDINGER, 1899), closely related to the “*damocles*-complex”, are depending on *Hedysarum*-species as larval food. Probably the evolution of the subgenus *Agrodiaetus* took place in parallel co-evolution with that of the genera *Hedysarum* L. and *Onobrychis* GAERTN. (which most likely is a *Hedysarum* derivative), the young section of which most likely evolved during the formation period of the main Asian continental mountain ranges (FEDTSCHENKO 1901).

Acknowledgements

I wish to express sincere thanks to W. ECKWEILER, K. G. SCHURIAN (Frankfurt/Main), F. CARBONELL (France) and V. LUKHTANOV (St. Petersburg) for useful discussion. I extremely acknowledge my friend M. DANILEVSKY (Moscow), nice companion and experienced driver during this lucky trip. His critical reading of the original manuscript is also acknowledged. For kind field assistance I thank Mrs. A. TCHUVILIN and I. TCHUVILIN (Tula) and my son Anton DANTCHENKO. Thanks are further due to A. ORLOV (Moscow) for linguistic help.

References

- BLOOM, W. (1979): Descriptions of new butterflies from Iran. – Entomol. Ber. 39 (1): 11–14.
- BUDASHKIN, Y. (1990): Biology of *Agrodiaetus poseidon krymaeus* (SHELJ.) (Lepidoptera, Lycaenidae). – Vestn. Zool. 1: 85 [in Russian].
- CARBONELL, F. (1993): Contribution à la connaissance du genre *Agrodiaetus* HÜBNER (1822): le complexe ultraspecifique d'*Agrodiaetus* d'A. *transcaspica* STAUDINGER (1899). Lepidoptera: Lycaenidae. – Linneana Belgica 14 (2): 89–116.

- (1994): Le complexe d'*Agrodiaetus poseidon* HERRICH-SCHÄFFER (1851) en Turquie au Liban. Description d'une nouvelle sous-espece d'*A. theresiae* (Lepidoptera: Lycaenidae). – *Linneana Belgica* 14 (6): 291–302.
- DANTCHENKO, A. (1994): New taxa of the genus *Polyommatus* LATREILLE, 1804 from Tadzhikistan. – *Atalanta* 25 (1/2): 203–206.
- , & LUKHTANOV, V. (1993): Zur Systematik und Verbreitung der Arten der *Polyommatus* (*Agrodiaetus*) *damone*-Gruppe Südosteuropas und Südwestsibiriens (Lepidoptera, Lycaenidae). – *Atalanta* 24 (1/2): 75–84.
- DE LESSE, H. (1963): Une nouvelle sous-espece d'*Agrodiaetus altivagans* FORSTER (Lep. Lycaenidae). – *Alexanor* 3: 167–168.
- FEDTSCHENKO, B. (1901): Generis *Hedysari* revisio. – St. Petersburg, pp. 1–168 + 1–56 [in Russian].
- FORSTER, W. (1961): Bausteine zur Kenntnis der Gattung *Agrodiaetus* SCUDD. (Lep. Lycaen.). – *Zeitschr. Wien. Entomol. Ges.* 46: 8–13.
- GROSSHEIM, A. (1952): Flora of the Caucasus, vol. 50 (here: pp. 151–152, 350–376) [in Russian].
- HERRICH-SCHÄFFER, G. (1844): Systematische Bearbeitung der Schmetterlinge von Europa, vol. 1 (here: pp. 113–114, figs. 214–215). – Regensburg (Manz).
- (1851): Systematische Bearbeitung der Schmetterlinge von Europa, vol. 6 (here: p. 24). – Regensburg (Manz).
- SCHURIAN, K. G., OORSCHOT, H. VAN, & BRINK, H. VAN DEN (1992): *Polyommatus* (*Agrodiaetus*) *poseidon* (H.-S.) und *theresiae* sp. nov. aus der Türkei (Lepidoptera: Lycaenidae). *Nachr. entomol. Ver. Apollo, Frankfurt/Main*, N.F. 12 (4): 217–232.
- SHELJUZO, L. (1928): Neue palaearktische Lycaeniden. – *Lep. Rundschau* 2: 44–46.
- TALIEV, W. (1901): Sur la flore du Krimée et sur la role de l'homme dans le developement de sa vegetation. – *Trav. Soc. naturalistes Univ. Imp. Kharkow* 35 (1900): 109–338 [in Russian].
- (1904): La vegetation du sol de craie dans la Russia meridionale. – *Trav. Soc. naturalistes Univ. Imp. Kharkow* 39 (1904): 81–238 [in Russian].

Received: 3. iv. 1995